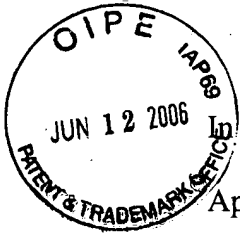


IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Thomas B. Lewis)

Group Art Unit: 2643)

Application No. 10/092,667)

Examiner: Melur Ramakrishnatah)

Filing Date: 3/6/2002)

**DECLARATION OF
DR. THOMAS B. LEWIS**For: VIDEO CONFERENCING DEVICE)
AND METHOD)Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450**CERTIFICATE OF MAILING**I hereby certify that this correspondence is being deposited with
the United States Postal Service as first class mail in an
envelope addressed to: Commissioner for Patents, P.O. Box
1450, Alexandria, VA 22313-1450 on 6/6/06By: *Teri Nelmark*
Teri Nelmark

I, Dr. Thomas B. Lewis, declare and affirm as follows:

1. I am a medical doctor and am one of the inventors of the subject matter disclosed and claimed in my U.S. Patent Application Serial No. 10/092,667.
2. I was told by Patent Counsel that the claims of my application were rejected by a combination of several references, one of them being a published application, namely, published application no. 2003/0112325 by Boyden, et al. I was also told that the Boyden reference was filed at the U.S. Patent and Trademark Office on December 13, 2001 and that if I together with my co-inventor, Dr. George D. Meixel, Jr. conceived and reduced our invention to practice prior to December 13, 2001, that Boyden, et al. would not remain as a viable reference. I believe that this is the case noting that Dr. Meixel and I filed our application a mere three months and three weeks after the Boyden, et al. published application was filed.
3. Appended as Exhibit A is a copy of a letter which Dr. Meixel sent to me dated prior to the critical date of December 13, 2001. At that time, recognition of the need to establish eye contact by proper camera placement was discussed. Pictures were taken at eye level and, depending upon the size of the television monitor, above eye level in comparison to known prior art, namely, the "Flohr System" and the "Sony D30" system. For a 20" television monitor, comparisons were taken at exact eye level and at 3.5 inches above it while for a 32" monitor, five inches above eye

level for our proposed system noting that, in each instance, the prior art had camera placement well above that suggested by Dr. Meixel. A true copy of this letter is appended as Exhibit A.

4. An abstract was then prepared by Dr. Meixel, a copy of which is appended as Exhibit B. Exhibit B also bears a date prior to the critical date of December 13, 2001. At that time, it was recognized that the prior art strongly suggests not placing a camera in front of the image located upon the video monitor. The suggested invention refuted this approach noting the advantage of putting a small video camera in front of the image at a critical position between the eyes and approximately one to two inches above them.

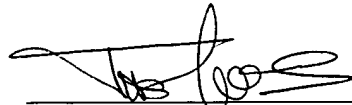
5. Exhibit C is a further expansion of the inventive concept in the form of a true copy of a draft circulated between myself and Dr. Meixel. At this time, the criticality of camera placement and the suggestion of a formula or "model" to determine appropriate camera placement was suggested establishing a relationship between camera height above the tip of one's nose, critical camera angle and the distance of the lens from the tip of the nose. At this time, the maximum critical angle was suggested as being six degrees while our present application limited this value further from zero to three degrees.

6. Exhibit D is a true copy of yet another memorandum circulated between myself and Dr. Meixel providing further appreciation of our invention by again fine tuning the algorithm discussed above. This memorandum is again dated prior to the critical date of December 13, 2001 and relates image size to camera positioning.

7. Finally, Exhibit E is a true copy of pages from my notebook, each dated prior to the effective date of December 13, 2001. As noted, I had an appreciation of the need to place the video camera in front of the face of the video conferee proximate the eyes of the conferee unlike the known prior art that thought that such placement would be distracting.

Dated: _____

5/31/2006



DR. THOMAS B. LEWIS

10-02-01 pix to Tom

GEORGE D. MEIXEL, JR., PH.D.

8507 TERRACE DRIVE • EL CERRITO, CALIFORNIA • 94530

HOME PHONE (510)526-9076 • WORK PHONE (510)357-1425 • email mmeixel@mindspring.com

October 2, 2001

Thomas B. Lewis, M.D.
350 Parnassus Ave.
San Francisco, CA 94117

RE: Possible demo of eye contact.

Dear Tom:

FYI I have enclosed some rough results that test a possible demonstration of the effectiveness of our eye contact method using pictures taken from different elevations.

All pictures were taken with the plane of the film 48 inches from the bridge of the nose.

Mary used a disposable camera to take pictures of me. After we experienced the difficulty of holding both the camera and my head still, we decided to use a camera mounted on a tripod to take the exposures of Bill.

Pictures are labeled in inches above eye level. The picture labeled 0 is taken with the center of the camera lens at eye level. The picture labeled 2 is taken with the center of the camera lens at 2 inches above eye level. The pictures of me are labeled on the back. The pictures of Bill are labeled at the bottom middle.

The estimated vertical positions above eye level for the actual camera systems are as follows:

For 20" TV

Our system	3.5"
Flohr system	6.5"
Sony D30	11.0"

For 32" TV

Our system	5.0"
Flohr system	9.5"
Sony D30	14.0"

The "eye contact quality" is found by examining the picture taken nearest the vertical camera position as specified by the table above for Our system, Flohr and Sony D30.

Hope this makes a little sense.

Full Eye Contact Camera System for Videoconferencing

Abstract

Prior Art

Flohr
Machtig
Etc.

Background

Prior patents emphasize that camera must not be placed in front of image.

Main Features of this Invention

1. Small video camera is located in front of picture. Camera currently being used is 0.5" dia. X 2.5" long.
2. Camera is placed between the eyes of the imaged face and approximately 1"-2" above them.
3. Eyes of person are at approximately the same level as the eyes of the image.
4. Person is approximately 42"- 48" from picture to simulate natural conversation distance.
5. Camera is mounted on a pan-tilt support for ease of use (not essential).
6. Camera has digital zoom for ease of use (not essential).
7. Careful lighting illuminates face so that details of skin surface around eyes and mouth are clearly shown, possible shadows around eyes are eliminated and there is no glare off forehead, cheeks or nose.
8. Picture is displayed on a flat panel LCD or plasma display for appeal to user (not essential). Size of display ranges from 20" to 40" diagonal so that the image head is approximately the same size as the head of the person viewing it.

Eye Contact Model for Videoconferencing DRAFT – 11/28/01

Assumptions

1. The videoconferencing configuration is as sketched in Fig. 1.

2. The faces are centered in the field of view for each camera. Consequently, the images of the faces are centered on the TV screens.
3. The flesh faces are directly opposite the image faces. Horizontal lines from the eyes of the flesh faces intersect the eyes of the image faces.
4. People determine whether or not they have eye contact during a videoconference by assessing the apparent angle, shape, size and movement of facial features such as the eyes and nose. If the angle, shape, size and movement of these facial features differs from what is expected for eye contact, people determine that they do not have eye contact.
5. There is a critical angle for eye contact. If visual deviations from straight-on eye contact are less than those for the critical angle, eye contact is possible. If deviations from straight-on eye contact are greater, eye contact is not possible.
6. The configuration of the videoconference, as specified in 1 and 2 above, limit deviations from straight-on eye contact to those deviations that are caused by the camera.
7. Camera location is constrained to be on a vertical plane through the tip of the flesh nose and the tip of the image nose

Definitions

Camera angle	Θ
Camera height above nose tips	H
Critical camera angle	Θ_{crit}
Distance of lens from flesh nose tip	D

Comments

Eye contact can take place if the camera angle is less than Θ_{crit} . Tom Lewis' measurements on 11/24/01 determined his critical angle to be approximately 6 deg. Expressing the camera angle as the inverse tangent of H/D relates the eye contact condition to the geometry which we can check for different people, camera to subject distance D, monitor sizes, etc.

Model

Eye_Contact is true if $((\tan^{-1}(H/D)) \leq \Theta_{crit})$

Model Verification

H and D can be varied to see if there is eye contact when the camera angle is less than the critical camera angle.

1. ~~For example, if there is eye contact when the camera is 48" from the subject, moving~~
the subject 24" closer to the camera should require that the camera be lowered to half its initial height above the nose tips.

2. For a given H and D that results in eye contact, any size monitor should give eye contact. A 13" monitor should work, and a 27" monitor should work.

3. For a given H and D that results in eye contact, moving the monitor further from the subject should not change the eye contact condition.

4. Etc.

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Algorithm Verification – 12-08-01 to 12-09-01

Eye Contact Algorithm

a. Draft Algorithm for best eye contact videoconferencing

- Must have life size face (+/- 25%).
- Less than 8' separation distance between viewer and screen.
- Camera positioned above eyebrows on vertical midline of face.
- Satisfy

Eye_Contact is true if $((\tan^{-1}(H/D)) \leq \Theta_{crit})$
 where:

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Camera angle	Θ
Camera height above nose tips	H
Critical camera angle	Θ_{crit}
Distance of lens from flesh nose tip	D

Include figure with two set-ups and appropriate nomenclature.

b. Draft algorithm for possible eye contact

- Face visible on screen.
- Separation distance permitting clear, view of screen
- Satisfy

Eye_Contact is true if $((\tan^{-1}(H/D)) \leq \Theta_{crit})$
 where:

Camera angle	Θ
Camera height above nose tips	H
Critical camera angle	Θ_{crit}
Distance of lens from flesh nose tip	D

What we will test this weekend

Same size heads on 27" monitor, nose tip to nose tip alignment with separation distance $D = 10', 8', 6', 4', \text{ and } 2'$ with H less than, equal to and greater than H_{crit} . This should show that our algorithm works.

Tandberg 1000 simulation to show either (1) we can get eye contact or (2) eye contact doesn't happen because face is too small or for some other reason. This should show that we are able to evaluate a challenging case.

Eye contact with 13" monitor to show that this might be a viable system, a future application at the limit of eye contact videoconferencing.

Data to be taken

Size of screens, D, H, eye contact (yes or no).

MAY 10 2006

9/17/2001

DERGOSITS & NOAH, LLP

For some time now George Meixel (GM) and I have been working on some improvements in current videoconferencing (VC) technology.

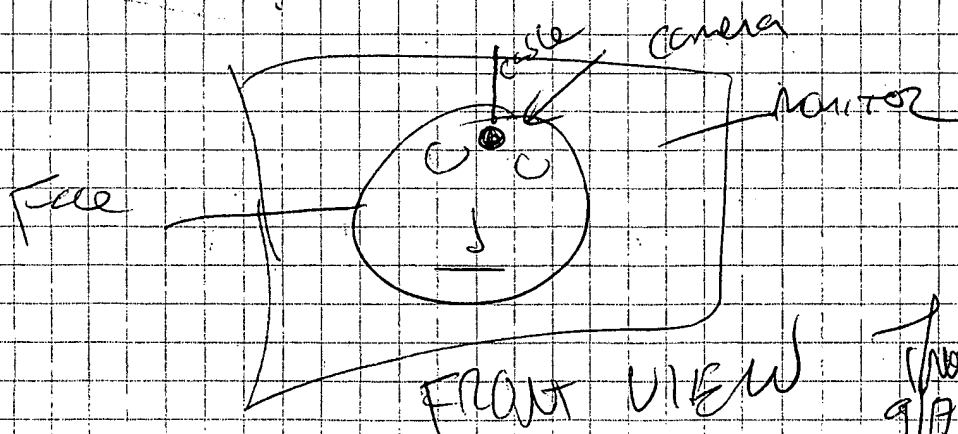
Recently I purchased "Patent + Yourself, 8th Edition" by David Pressman, and have just read the chapter on documentation. With new appreciation for the importance of documentation, I am now setting forth this record of our inventions in this area.

GM (Mike) & I had discussed for some time the inadequacy of current VC as far as the transmission of emotional information goes.

In particular, current VC lacks a means for producing normal eye-contact during the conversation - a problem that is well-known to be annoying. I do not believe it is known or recognized that this problem is devastating to the enterprise of VC, and in my opinion, the lack of eye contact during VC is the major reason that the technology has not been accepted by consumers - which for the most part it has not, despite its evident potential for utility. It is simply too unpleasant for normal, emotionally fluent people to converse with others who do not make proper eye contact.

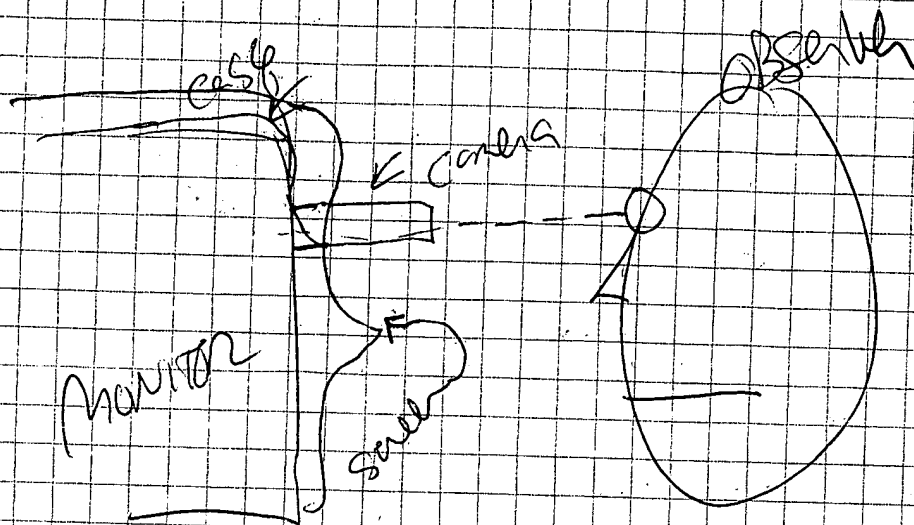
GM and I researched available products and could not find one that adequately facilitated/permitted eye contact. Couldn't find anything that works.

On 10/5/2000, we did an experiment in which we placed a simulated "lipstick" camera directly on the screen in front of a face.



SIDE VIEW

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By placing the camera directly "on top" of the image of the face we could create real eye contact - not just the illusion of eye contact as other methods provide while others in the field had tried hard to engineer designs that permit the camera to be as close as possible to the face on the monitor without actually obscuring or covering the face, we thought otherwise.

We thought - Go ahead and obscure the face a little. The distraction of this type of camera (3/8" diameter, mounted) is not that much of an impediment to viewing, so long as it is viewed end-on.

3/8"

X

1/17/70

4

It turns out that the camera is like
eyeglasses - so long as you can see the other
person's eyes, the brain habituates to and
ignores the irrelevant stimulus.

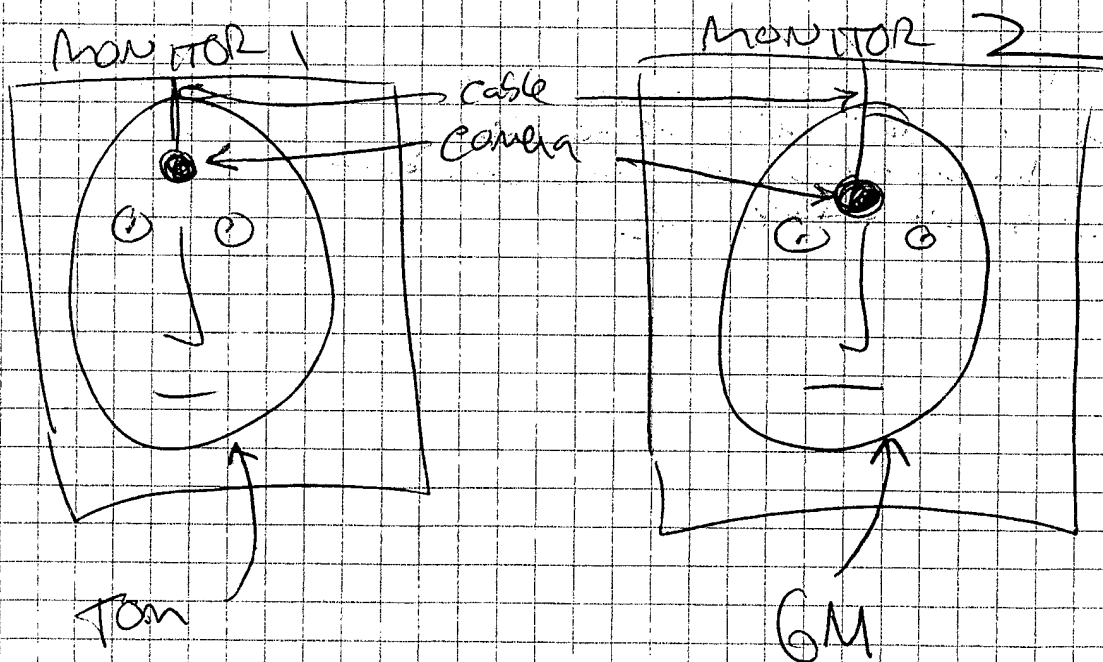
That is the key to our invention -
use a small diameter cylindrical camera,
place it superimposed on the face of the
person in the monitor - in between the eyes,
or slightly superior to the eyes in the
lower forehead area.

In the 10/5 experiment, we used a mockup
of a Sony DXC-LS1 (wooden dowel, painted black,
same diameter)

On 11/24/00, we conducted an experiment
at my apartment, 157 Crest Ave

We used 2 lipstick cameras and 2 monitors
to test eye-contact VC.

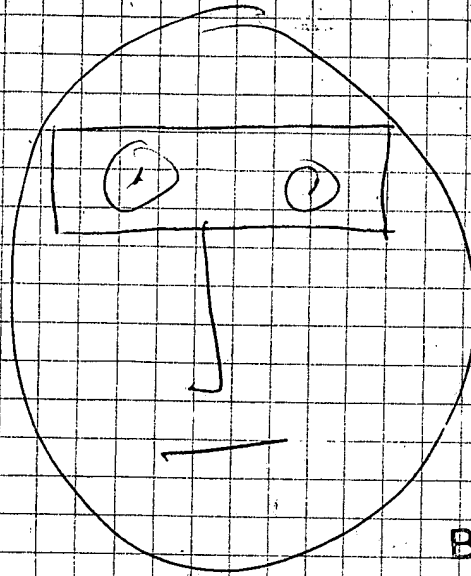
The cameras were a Sony DXC-LS1
and a Toshiba Lipstick camera



Thompson
9/7/2007

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Based on measurements taken in that
experiment, I observed that the camera
could be placed anywhere within a rectangle
of approximately this configuration -



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without disrupting eye contact. Placing the
camera outside this rectangle proved
too disruptive to eye contact
and was not effective.